WHAT IS CLAIMED IS:

1. A method for assembling a gas turbine engine assembly, said method comprising:

providing at least one propelling gas turbine engine that includes a core engine including at least one turbine; and

coupling an auxiliary engine to the propelling gas turbine engine such that during operation of the propelling gas turbine engine, at least a portion of the airflow entering the propelling gas turbine engine is extracted from the propelling gas turbine engine upstream from the core engine turbine, and channeled to the auxiliary engine for generating power.

2. A method in accordance with Claim 1 wherein coupling an auxiliary engine to the propelling gas turbine engine further comprises coupling the auxiliary engine to the propelling gas turbine engine such that during operation of the propelling gas turbine engine, the airflow channeled to the auxiliary engine from the propelling engine is at a higher pressure than a pressure of the airflow entering the propelling gas turbine engine.

3. A method in accordance with Claim 1 wherein coupling an auxiliary engine to the propelling gas turbine engine further comprises coupling the auxiliary engine to the propelling gas turbine engine such that during operation of the propelling gas turbine engine, the airflow channeled to the auxiliary engine from the propelling engine is at a higher temperature than a temperature of the airflow entering the propelling gas turbine engine.

4. A method in accordance with Claim 1 wherein coupling an auxiliary engine to the propelling gas turbine engine further comprises coupling the auxiliary engine to the propelling gas turbine engine such that during operation of the propelling gas turbine engine, the airflow channeled to the auxiliary engine from the propelling engine is at a higher density than a density of the airflow entering the propelling gas turbine engine.

5. A method in accordance with Claim 1 wherein coupling an auxiliary engine to the propelling gas turbine engine further comprises coupling the auxiliary engine to the propelling gas turbine engine such that operation of the auxiliary engine facilitates generating increased shaft horsepower during operation of said gas turbine engine assembly.

6. A method in accordance with Claim 1 wherein coupling an auxiliary engine to the propelling gas turbine engine further comprises coupling the auxiliary engine to the propelling gas turbine engine such that during operation of the propelling gas turbine engine, airflow channeled to the auxiliary engine from the propelling engine is channeled through an intercooler before entering the auxiliary engine.

7. A method in accordance with Claim 1 further comprising coupling either a variable area bypass injector or a mixing damper to the auxiliary engine and to the propelling gas turbine engine such that exhaust discharged from the auxiliary and propelling gas turbine engines flows through the mixing damper or the variable area bypass injector.

8. A method in accordance with Claim 1 wherein coupling an auxiliary engine to the propelling gas turbine engine further comprises coupling the auxiliary engine to the propelling gas turbine engine such the operation of the auxiliary engine is independent of the operation of the propelling gas turbine engine.

9. A method in accordance with Claim 1 wherein coupling an auxiliary engine to the propelling gas turbine engine further comprises coupling the auxiliary engine to the propelling gas turbine engine such that exhaust is discharged from the auxiliary engine independently from exhaust discharged from the propelling gas turbine engine.

10. A method in accordance with Claim 1 wherein coupling an auxiliary engine to the propelling gas turbine engine further comprises coupling the auxiliary engine to the propelling gas turbine engine such that during operation of the

gas turbine engine assembly, the auxiliary engine facilitates enhancing a surge margin of the propelling engine.

11. A method in accordance with Claim 1 wherein coupling an auxiliary engine to the propelling gas turbine engine further comprises coupling the auxiliary engine to the propelling gas turbine engine such that during operation of the gas turbine engine assembly, the auxiliary engine facilitates improving the operating performance of the propelling engine.

12. A method in accordance with Claim 1 further comprising coupling a control system to the auxiliary engine to facilitate controlling an operational speed of the auxiliary engine.

13. A method in accordance with Claim 1 wherein coupling a control system to the auxiliary engine further comprises coupling a control system including at least one adjustable air throttle valve to the auxiliary engine.

14. A gas turbine engine assembly comprising:

at least one propelling gas turbine engine comprising a fan and a core engine downstream from the fan; and

an auxiliary engine used for generating power, said auxiliary engine comprising at least one turbine and an inlet, said inlet coupled in flow communication with said propelling gas turbine engine core engine, such that a portion of airflow entering said at least one propelling engine is extracted for use by said auxiliary engine.

15. A gas turbine engine assembly in accordance with Claim 14 wherein said auxiliary engine receives air that has been extracted from said at least one propelling gas turbine engine upstream from said core engine turbine.

16. A gas turbine engine assembly in accordance with Claim 14 wherein said auxiliary engine receives airflow from said at least one propelling gas

turbine engine that is at an increased pressure than a pressure of airflow entering said at least one propelling gas turbine engine.

17. A gas turbine engine assembly in accordance with Claim 14 wherein said auxiliary engine receives airflow from said at least one propelling gas turbine engine that is at an increased temperature than a temperature of airflow entering said at least one propelling gas turbine engine.

18. A gas turbine engine assembly in accordance with Claim 14 wherein said auxiliary engine receives airflow from said at least one propelling gas turbine engine that is at an increased density than a density of airflow entering said at least one propelling gas turbine engine.

19. A gas turbine engine assembly in accordance with Claim 14 wherein said auxiliary engine facilitates generating increased shaft horsepower during operation of said gas turbine engine assembly.

20. A gas turbine engine assembly in accordance with Claim 14 further comprising an intercooler coupled between said at least one propelling engine and said auxiliary engine inlet, wherein said intercooler facilitates increasing the power generation of said auxiliary engine.

21. A gas turbine engine assembly in accordance with Claim 14 further comprising a control system coupled to said auxiliary engine for controlling an operational speed of said auxiliary engine turbine.

22. A gas turbine engine assembly in accordance with Claim 14 further comprising a control system coupled to said auxiliary engine to facilitate enhancing surge margin and operational performance of said at least one propelling engine.

23. A gas turbine engine assembly in accordance with Claim 23 wherein said control system comprises at least one adjustable air throttle valve coupled in flow communication with said auxiliary engine.

24. A gas turbine engine assembly in accordance with Claim 14 further comprising a variable area bypass injector coupled in flow communication with an exhaust of said auxiliary engine and an exhaust of said at least one propelling gas turbine engine.

25. A gas turbine engine assembly in accordance with Claim 14 wherein said auxiliary engine is operable independently of operation of said at least one propelling gas turbine engine.

26. A gas turbine engine assembly in accordance with Claim 14 wherein an exhaust of said auxiliary engine is channeled independently from an exhaust of said propelling gas turbine engine.

27. A gas turbine engine assembly in accordance with Claim 14 wherein said auxiliary engine facilitates enhancing a surge margin of said at least one propelling engine.

28. A gas turbine engine assembly in accordance with Claim 14 wherein said auxiliary engine facilitates improving operating performance of said at least one propelling engine.

29. An aircraft gas turbine engine assembly, said assembly comprising:

at least one propelling gas turbine engine comprising a core engine and an exhaust, said core engine comprising at least one turbine, said at least one propelling gas turbine engine for generating thrust for the aircraft; and

at least one auxiliary engine comprising an inlet, at least one turbine, and an exhaust, said inlet coupled in flow communication with said at least one propelling gas turbine engine, such that a portion of airflow flowing through said propelling engine is extracted from said propelling engine upstream from said propelling engine turbine, and is channeled to said auxiliary engine for generating power.

30. An aircraft gas turbine engine assembly in accordance with Claim 29 wherein airflow extracted from said at least one propelling engine is channeled to said at least one auxiliary engine at a higher pressure than airflow entering said propelling gas turbine engine.

31. An aircraft gas turbine engine assembly in accordance with Claim 29 wherein said at least one auxiliary engine is operable independently of said at least one propelling gas turbine engine.

32. An aircraft gas turbine engine assembly in accordance with Claim 29 wherein said at least one auxiliary engine facilitates generating increased shaft horsepower during operation of said gas turbine engine assembly.

33. An aircraft gas turbine engine assembly in accordance with Claim 29 further comprising an intercooler coupled between said auxiliary engine inlet and said at least one propelling engine, said intercooler facilitates increasing the power generation of said at least one auxiliary engine.

34. An aircraft gas turbine engine assembly in accordance with Claim 29 further comprising a control system coupled to said auxiliary engine for controlling an operational speed of said auxiliary engine turbine.

35. An aircraft gas turbine engine assembly in accordance with Claim 34 wherein said control system comprises at least one throttled valve coupled in flow communication with said auxiliary engine.

36. An aircraft gas turbine engine assembly in accordance with Claim 29 further comprising a variable area bypass injector coupled in flow communication with said auxiliary engine exhaust and said at least one propelling gas turbine engine exhaust.

37. An aircraft gas turbine engine assembly in accordance with Claim 29 wherein said at least one auxiliary engine facilitates enhancing a surge margin of said at least one propelling engine.

38. An aircraft gas turbine engine assembly in accordance with Claim 29 wherein said auxiliary engine facilitates improving operating performance of said at least one propelling engine.

39. An aircraft gas turbine engine assembly in accordance with Claim 29 wherein an exhaust of said auxiliary engine is channeled independently from an exhaust of said at least one propelling engine